

WHAT IS CLAIMED IS:

- 1 1. A method for processing digital video signals for live video
2 applications, the method comprising:
3 providing video data comprising a plurality of frames;
4 identifying a first frame and a second frame in the frame sequences;
5 processing the information of the first frame and the information of the second
6 frame to determine a quantization step value for the second frame;
7 adjusting a transmission bit rate for the second frame in response to the
8 quantization step value.
- 1 2. The method of claim 1 wherein the providing video data comprises:
2 assigning compression modes to the frames.
- 1 3. The method of claim 2 wherein the compression modes are selected
2 from a group comprising I-mode, P-mode, and B-mode.
- 1 4. The method of claim 1 wherein the processing the information of the
2 first frame and the information of the second frame comprises:
3 calculating a sigmaSAD value for the second frame;
4 calculating a divisor value for the second frame;
5 calculating the quantization step for the second frame.
- 1 5. The method of claim 4 wherein the calculating a sigmaSAD value
2 comprises:
3 calculating a SAD value for each microblock of the second frame;
4 storing the SAD value in a memory unit for each microblock of the second
5 frame;
6 calculating the sum of all the SAD values for the second frame;
7 dividing the sum by the total number of microblocks of the second frame.
- 1 6. The method of claim 4 wherein the calculating a divisor value
2 comprises
3 selecting a series of integers that is indexed from 0 through n-1;
4 selecting a complexity integer;
5 calculating the quotient modulo n of the complexity integer;

6. setting the divider value equal to an integer whose index in the series equals
7 the quotient;
8 wherein n is an integer larger than 1.
- 1 7. The method of claim 6 wherein the selecting a complexity integer
2 comprises:
3 if the second frame is an I-frame, setting the complexity integer near midrange
4 between an integer A and an integer B;
5 if the second frame is not an I-frame, adjusting the complexity integer so that
6 the fullness of a buffer varies toward a predefined fullness level.
- 1 8. The method of claim 4 wherein the calculating the quantization step
comprises setting the quantization step equal to the sum of the ratio of the sigmaSAD value to
the divisor value, and a constant.
9. The method of claim 8 wherein the constant equals 1.
10. The method of claim 1 wherein the processing the information of the
first frame and the information of the second frame comprises:
deciding whether to encode a frame in the I-mode before any P-frame
encoding is accomplished.
11. The method of claim 6 wherein the processing comprises:
Adjusting the complexity integer so that the size of encoded data for anyone of
3 the plurality of frames has approximately an equal size.
- 1 12. The method of claim 1 wherein the method for processing digital video
2 signals further comprises:
3 determining the locations of I-frames in the step of providing video data;
4 extending frames immediately preceding the I-frames for one additional frame
5 time;
6 skipping frames immediately following the I-frames.
- 1 13. A system including a processor for processing digital video signals for
2 live video applications, the system comprising:
3 a memory unit within which a computer program is stored, the computer
4 program comprising:

5 code that instructs the processor to receive video data comprising a plurality of
6 frames;
7 code that directs the processor to identify a first frame and a second frame in
8 the frame sequences;
9 code that directs the processor to process the information of the first frame and
10 the information of the second frame to determine a quantization step for the second frame.

1 14. The system of claim 13 wherein the code that directs the processor to
2 process the information of the first frame and the information of the second frame comprises:
3 code that calculates a sigmaSAD value for the second frame;
4 code that calculates a divisor value for the second frame;
code that calculates the quantization step for the second frame.

15. The code of claim 14 that calculates a sigmaSAD value comprises:
code that calculates a SAD value for each microblock of the second frame;
code that stores the SAD value in a memory unit for each microblock of the
second frame;
code that calculates the sum of all the SAD values for the second frame;
code that divides the sum by the total number of microblocks of the second
frame.

16. The code of claim 14 that calculates a divisor value comprises
code that selects a series of integers that is indexed from 0 through n-1;
code that selects a complexity integer;
code that calculates the quotient modulo n of the complexity integer;
code that sets the divider value equal to an integer whose index in the series
equals the quotient;
wherein n is an integer larger than 1.

17. The code of claim 16 that selects a complexity integer comprises:
code that sets the complexity integer near midrange between an integer A and
an integer B if the second frame is an I-frame;
code that adjusts the complexity integer so that the fullness of a buffer varies
toward a predefined fullness level if the second frame is not an I-frame.

1 18. A system for processing digital video signals for live video
2 applications, the system comprising:
3 a video providing subsystem that provides video data comprising a plurality of
4 frames;
5 a sigmaSAD calculation subsystem that calculates a value of sigmaSAD;
6 a divisor calculation subsystem that calculates a value of divisor.

1 19. The system of claim 18 wherein the sigmaSAD calculation subsystem
2 comprises:
3 a subsystem that calculates a SAD value for each microblock of a frame of the
plurality of frames;
 a subsystem that stores the SAD value in a memory unit for each microblock
of the frame;
 a subsystem that calculates the sum of all the SAD values for the frame;
 a subsystem that divides the sum by the total number of microblocks of the
frame.

 20. The system of claim 18 wherein the divisor calculation subsystem
comprises
 a subsystem that selects a series of integers that is indexed from 0 through n-1;
 a subsystem that selects a complexity integer;
 a subsystem that calculates the quotient modulo n of the complexity integer;
 a subsystem that sets the divider value equal to an integer whose index in the
series equals the quotient;
 wherein n is an integer larger than 1.

1 21. The subsystem of claim 20 that selects a complexity integer comprises:
2 a subsystem that if the second frame is an I-frame, sets the complexity integer
3 near midrange between an integer A and an integer B;
4 a subsystem that if the second frame is not an I-frame, adjusts the complexity
5 integer so that the fullness of a buffer varies toward a predefined fullness level.

1 22. The system of claim 18 further comprises:
2 a quantization step calculation subsystem that sets the quantization step equal
3 to the sum of the ratio of the value of sigmaSAD to the value of divisor, and a constant.